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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/000,479	10/24/2001	Jigish D. Trivedi	3439.4US (97-936.3)	4131

24247 7590 11/05/2002

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EXAMINER

VU, HUNG K

ART UNIT PAPER NUMBER

2811

DATE MAILED: 11/05/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/000,479

Applicant(s)

TRIVEDI ET AL.

Examiner

Hung K. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 12-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Invention of Figure 3, Claims 1-11 in Paper No. 5 is acknowledged.

Claims 12-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Invention, there being no allowable generic or linking claim.

Election was made **without** traverse in Paper No. 5.

Response to Amendment

2. The Pre-Amendment, filed 01/29/02, has been entered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7 and 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeuchi (PN 5,766,997, of record).

Takeuchi discloses, as shown in Figure 13A, a source structure for a local interconnect comprising,

a semiconductor substrate (121);

a nitrogen-rich Ti layer (136,137) having a nitrogen-rich upper portion (137) and a titanium lower portion (136), wherein the nitrogen-rich upper portion is not pure titanium nitride, the titanium lower portion is substantially nitrogen-free, and the nitrogen-rich Ti layer overlies a portion of the semiconductor substrate;

a refractory metal layer (138) overlying the nitrogen-rich Ti layer;

a silicon layer (139) overlying the refractory metal layer.

Note Col. 17, lines 3-12 states that layer (136) is titanium and layer (137) is titanium with 0.5 to 3% by weight of N₂. Therefore, it is inherent that titanium layer (136) is substantially nitrogen-free, and nitrogen-rich layer (137) is not pure titanium nitride because pure titanium nitride (TiN) has more weight % of N₂.

With regard to Claim 2, Takeuchi discloses the semiconductor substrate is silicon substrate. (Col. 16, lines 38-40).

With regard to Claim 3, Takeuchi discloses the nitrogen-rich Ti layer is disposed over active areas (134,135) in the silicon substrate.

With regard to Claim 4, Takeuchi discloses the nitrogen-rich upper portion extends along an upper surface of the nitrogen-rich Ti layer.

With regard to Claim 5, Takeuchi discloses the titanium lower portion (136) of the nitrogen-rich Ti layer contains substantially no nitrogen. Note Col. 17, lines 3-12 states that layer (136) is

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titanium and layer (137) is titanium with 0.5 to 3% by weight of N₂. Therefore, it is inherent that titanium layer (136) contains substantially no nitrogen.

With regard to Claim 6, Takeuchi discloses a thickness of the nitrogen-rich upper portion ranges from 5Å to 200Å (within the range of about 50Å to about 100Å). (Col. 17, lines 7-9).

With regard to Claim 7, Takeuchi discloses a thickness of the nitrogen-rich Ti layer (136+137) ranges 105Å to 300Å (with the range of about 100Å to about 300Å). (Col. 17, lines 3-9 states that layer (136) is about 100Å and layer (137) is about 5Å to 200Å. So the total thickness of layers (136+137) is about 105Å to 300Å).

With regard to Claims 8 and 9, Takeuchi discloses the refractory metal layer comprises Ti.

With regard to Claim 10, Takeuchi discloses a thickness of the refractory metal layer (138) is 300Å (within the range of about 100Å to about 300Å). (Col. 17, lines 12-13).

With regard to Claim 11, Takeuchi discloses a thickness of the silicon layer ranges from about 750Å (within the range of about 400Å to about 1000Å). (Col. 17, lines 14-16).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The

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examiner can normally be reached on Mon-Thurs 7:00-4:30 and every other Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

November 1, 2002

Hung Lu